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SOUTHWEST FISHERIES CENTER

HONOLULU LABORATORY

NATIONAL MARINE FISHERIES SERVICE

P.O. BOX 3830

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FEBRUARY 1985

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National Marine Fisheries Service
2570 Dole Street
Honolulu, Hawaii

WESTERN PACIFIC FISHERY INFORMATION NETWORK ORGANIZATION AND DESIGN STATUS AND ISSUES JANUARY 1985

David C. Hamm
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National Marine Fisheries Service, NOAA
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NOT FOR PUBLICATION

ADMINISTRATIVE REPORT H-85-4

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Southwest Fisheries Center Administrative Report H-85-4

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INTRODUCTION

In recent years there has been a greatly increased demand for data concerning marine fisheries. The Magnuson Fishery Conservation and Management Act, the Marine Mammal Protection Act, the Endangered Species Act, and other acts have created new data and information requirements. Likewise, requirements of states and U.S. territories for information about marine resources have expanded in response to the increased need for development and management of insular resources. Many of the information systems of the states, territories, and the National Marine Fisheries Service (NMFS) are currently inadequate to meet these requirements. There is an urgent need to upgrade, develop, and establish links among the fishery information systems of these various agencies. To help meet these needs in the Pacific area and provide a central source of region-wide fisheries data, the Southwest Fisheries Center (SWFC), NMFS, developed the concept of the Fishery Information Network (FIN), and budgeted funds to assist in its implementation.

The overall purpose of FIN is to: Provide ready access to quality fisheries data needed for planning and management purposes.

The general philosophy of the FIN program is to assist existing local state and territorial fisheries offices to meet their new data and information requirements and thereby help meet new Federal requirements through exchange and sharing of informational resources. To achieve this goal, several broad activities have been identified:

1. Enhancement and modernization of existing fisheries information management and data collection systems.

2. Development and implementation of new information management and data collection systems.

3. Establishment of central and distributed, computerized data bases containing pertinent fisheries data needed for management purposes.

4. Establishment of a communication network among state, territorial, and NMFS data collecting and processing groups, thereby facilitating access and exchange of the computerized fisheries data bases.

The FIN is divided into three organizational entities: the California FIN (CALFIN); the Pacific coast FIN (PACFIN); and the Western Pacific FIN (WPACFIN). This paper is concerned with WPACFIN exclusively. The principal agencies involved in the initial design and implementation of WPACFIN include: the SWFC Honolulu Laboratory, NMFS; the Hawaii Department of Land and Natural Resources, Division of Aquatic Resources (DAR); the American Samoa Office of Marine Resources (OMR); the Guam Division of Aquatic and Wildlife Resources (DAWR); the Commonwealth of the Northern Mariana Islands

(CNMI) Division of Fish and Wildlife (DFW); the Western Pacific Regional Fishery Management Council (WPRFMC or the Council) and the Western Pacific Program Office (WPPO) of the Southwest Region (SWR), NMFS. These member agencies have been referred to as the "WPACFIN family" and are, by definition, the initial users of the system.

The purposes of this paper are: To describe WPACFIN organization and design; to report progress made in the design and implementation of WPACFIN as of January 1985; to serve as a discussion paper and planning document for continued design and implementation; and to identify some of the issues that need to be considered or resolved in the near future.

ORGANIZATION AND DESIGN

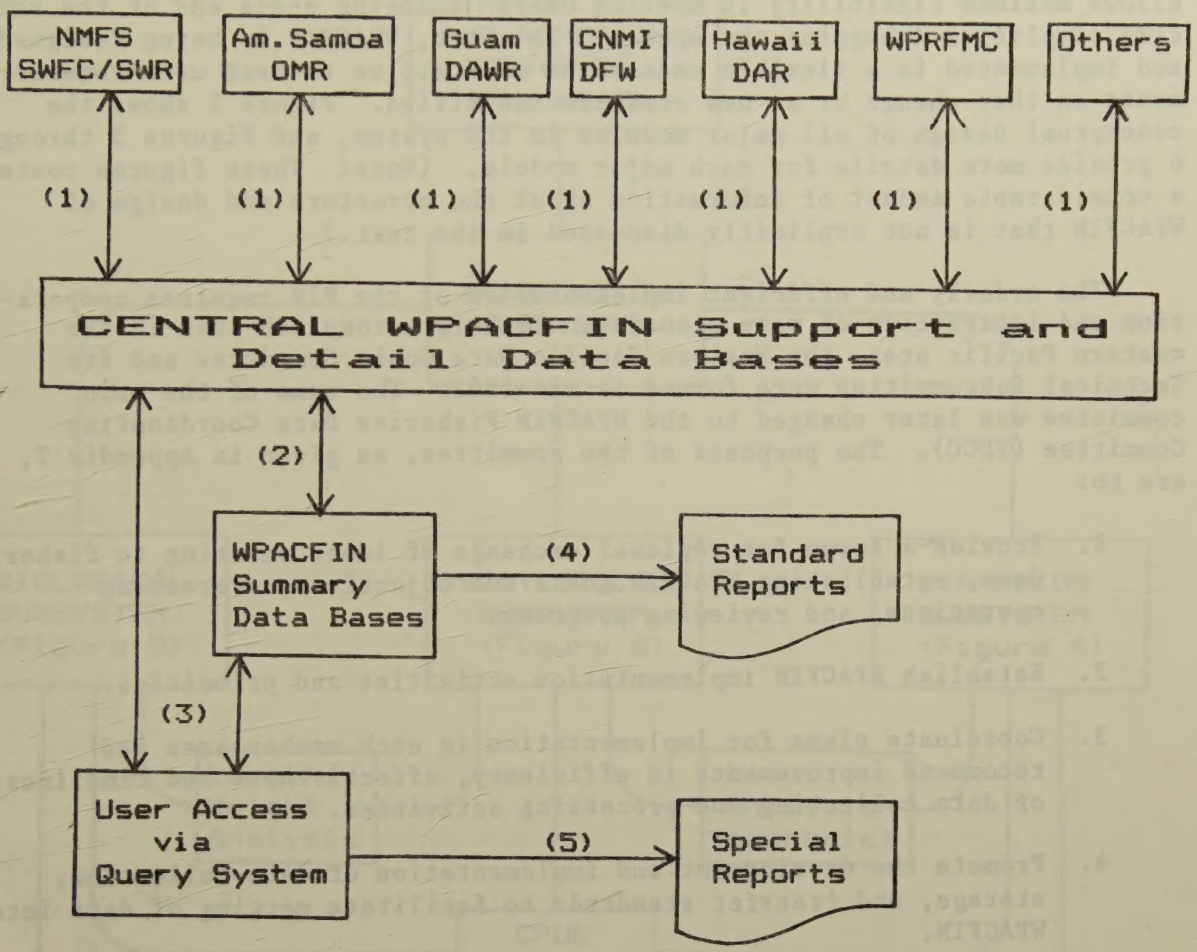
In recent years, it has been the policy of NMFS to utilize state fisheries offices as much as possible as a source of data and information on coastal marine resources. This policy has resulted from a number of considerations and certainly paramount among them was that most states have historically collected such data. Other considerations include: To reduce duplication of effort in data collecting and processing and thereby reduce overall costs; to reduce the burden of reporting information on fishermen and producers; to maximize use of available informational resources; and to help promote increased involvement of states in management and development of their local marine resources.

Local governmental fisheries offices in the WPACFIN region were identified as the major agencies collecting fisheries data. These "state" agencies, the SWFC, the SWR, and the Council are involved to various degrees in analyzing the data and managing the fisheries resources. Given this and the above Federal policy, it followed logically that the local fisheries agencies should become the major organizational elements in the network. Figure 1 shows the basic design of WPACFIN incorporating this philosophy.

The foundation for the design of WPACFIN is based on the four major FIN activities and the idea that FIN should be implemented in a stepwise and modular fashion. Based on these general concepts and some basic fisheries information needs in the western Pacific, the WPACFIN Program Manager has been following a structured, top-down "zigzag" approach to designing WPACFIN, and a bottom-up incremental approach to testing, refining, and implementing various modules of the information network. Implementing WPACFIN in a "stepwise and modular fashion" means that portions of the data bases and information network will be developed, tested, and put into use before others, i.e., one step at a time, and that the system will be divided into identifiable projects, tasks, subsystems, or functional entities called modules. "Structured top-down" refers to the design technique of starting with the most general statement of what needs to be done, and then systematically dividing the job into more and more specific tasks until all work elements (modules) have been identified and are linked together (structured) in the most efficient manner. "Zigzag," a term recently used by analysts to describe a frequently used modification of the standard top-down technique, refers to the detailed development of some branches and modules of the design structure before development of all branches. This modification has

FIGURE 1

BASIC WPACFIN DESIGN



(1) Sharing of fisheries data among WPACFIN participants using established communication network.

(2) Creation of summary data files by WPACFIN based on detailed data submitted by participating agencies.

(3) User access and analysis of centralized fisheries data. Access to confidential data restricted.

(4) Periodic standard reports created and distributed by WPACFIN based on data submitted by participating fisheries agencies.

(5) Special user generated reports.

been adopted in response to user requirements and a desire to maintain flexibility in the development of the information network. The "bottom-up incremental approach to testing, refining, and implementing" modules of WPACFIN means the lowest (i.e., bottom) modules of a particular branch or subsystem in the design will be coded and tested one module at a time, and then, added together and tested one module at a time from the bottom-up, until all modules in a subsystem are tested and implemented. This technique allows maximum flexibility in meeting users' changing needs and at the same time simplifies debugging the system. In short, WPACFIN is being designed and implemented in a flexible manner and will evolve to meet user requirements as they change or as new ones are identified. Figure 2 shows the conceptual design of all major modules in the system, and Figures 3 through 6 provide more details for each major module. (Note: These figures contain a considerable amount of information about the structure and design of WPACFIN that is not explicitly discussed in the text.)

The orderly and efficient implementation of the FIN requires cooperation and interaction of many agencies. To help accomplish this in the western Pacific area, the Western Pacific Data Goals Committee and its Technical Subcommittee were formed in mid-1982. The name of the main committee was later changed to the WPACFIN Fisheries Data Coordinating Committee (FDCC). The purposes of the committee, as given in Appendix I, are to:

1. Provide a forum for regional exchange of ideas relating to fisheries data, establishing WPACFIN goals and objectives, overseeing operations, and reviewing progress.

2. Establish WPACFIN implementation activities and priorities.

3. Coordinate plans for implementation in each member area and recommend improvements in efficiency, effectiveness and timeliness of data collecting and processing activities.

4. Promote the development and implementation of data collection, storage, and transfer standards to facilitate merging of data into WPACFIN.

5. Designate membership of a Technical Subcommittee and coordinate the subcommittee's work on technical aspects of implementing WPACFIN.

The FDCC provides guidance in many areas requiring cooperation and communication among participating agencies and is the body that decides issues such as addition of users to the system, and specifies mechanisms of interaction among member agencies.

Initial analysis of data collecting and processing capabilities and standards of fisheries agencies in the central and western Pacific revealed that only the Honolulu Laboratory and the State of Hawaii DAR had any automated processing capabilities. Existing data collecting and processing systems had been created piecemeal, and lacked centralized organization,

FIGURE 2

DATA ANALYSIS MODULES

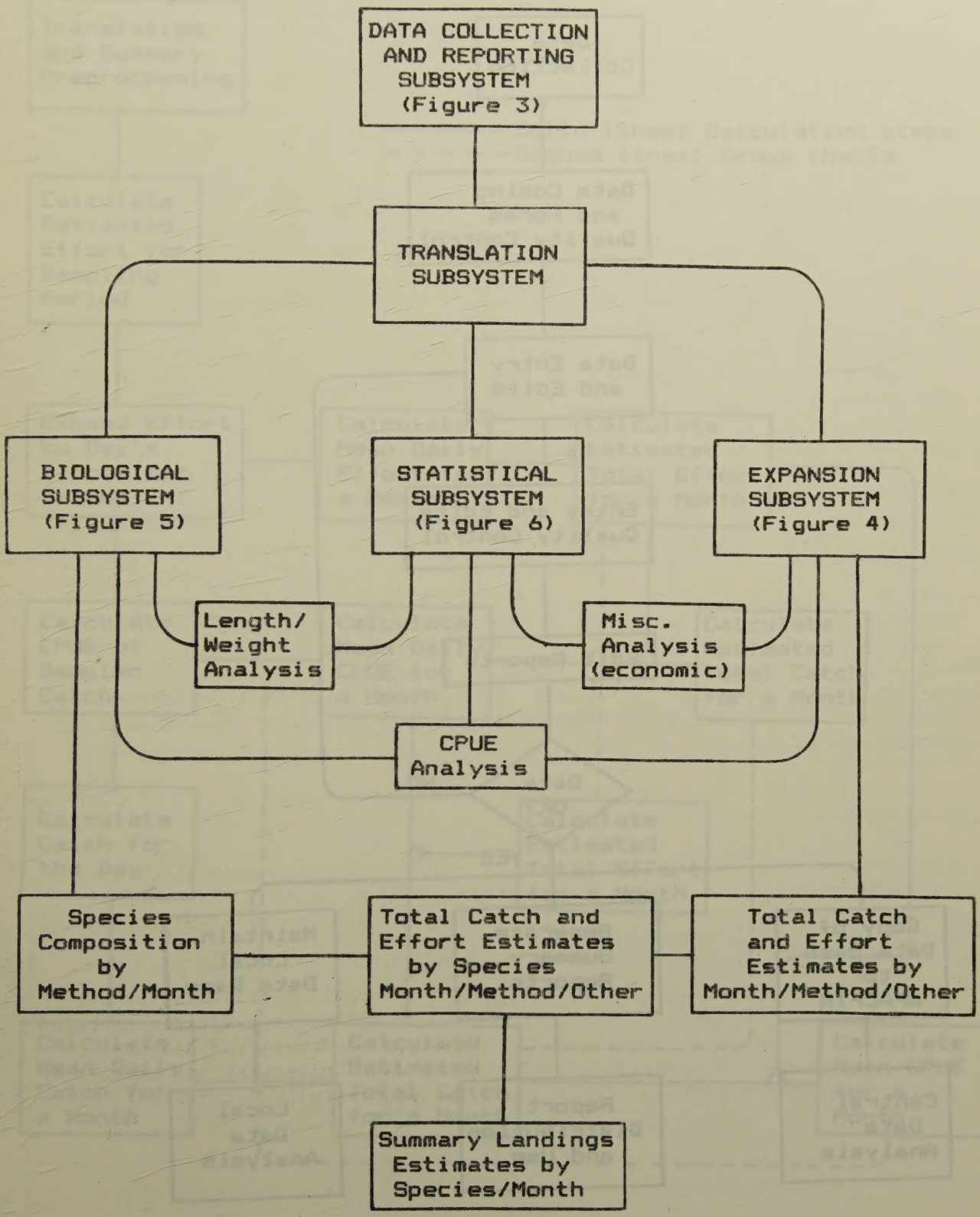

DATA COLLECTION AND REPORTING SUBSYSTEM (Figure 3)
TRANSLATION SUBSYSTEM
BIOLOGICAL SUBSYSTEM (Figure 5)
STATISTICAL SUBSYSTEM (Figure 6)
EXPANSION SUBSYSTEM (Figure 4)
Length/ Weight Analysis
Misc. Analysis (economic)
CPUE Analysis
Species Composition by Method/Month
Total Catch and Effort Estimates by Species Month/Method/Other
Total Catch and Effort Estimates by Month/Method/Other
Summary Landings Estimates by Species/Month

FIGURE 3

DATA COLLECTION AND REPORTING SUBSYSTEM

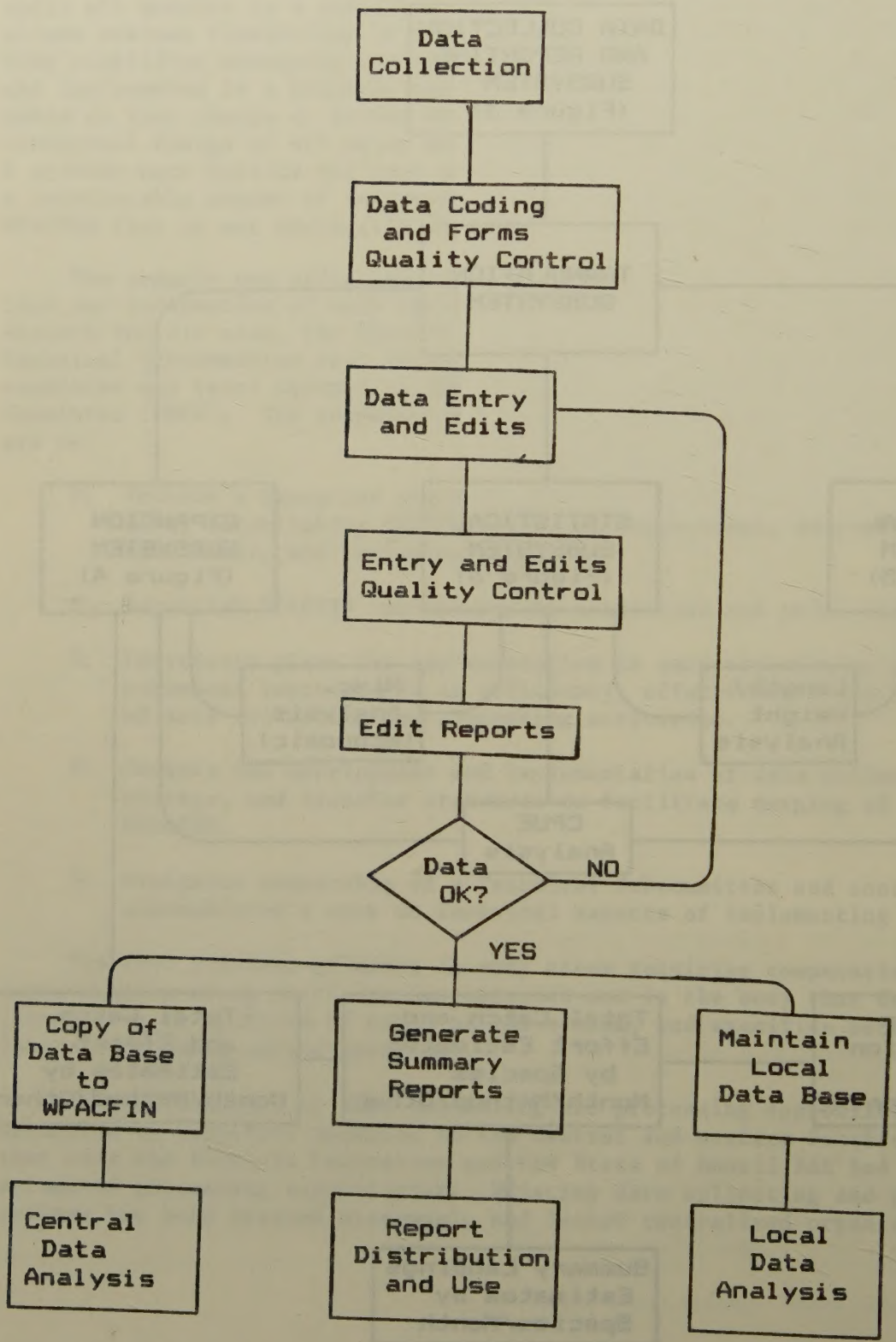


FIGURE 4

EXPANSION SUBSYSTEM

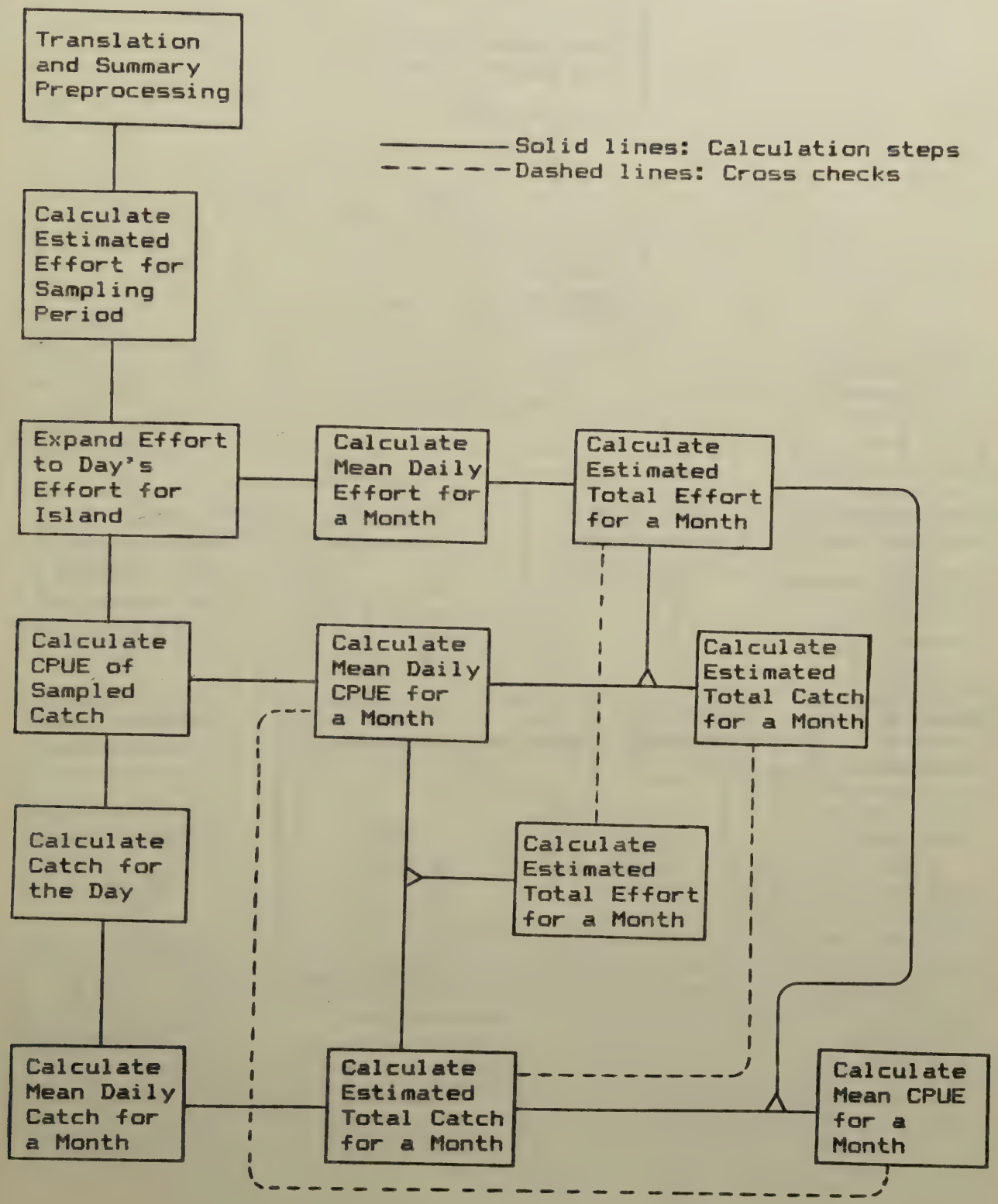

Translation and Summary Preprocessing
Solid lines: Calculation steps
Dashed lines: Cross checks
Calculate Estimated Effort for Sampling Period
Expand Effort to Day's Effort for Island
Calculate Mean Daily Effort for a Month
Calculate Estimated Total Effort for a Month
Calculate CPUE of Sampled Catch
Calculate Mean Daily CPUE for a Month
Calculate Estimated Total Catch for a Month
Calculate Catch for the Day
Calculate Estimated Total Effort for a Month
Calculate Mean Daily Catch for a Month
Calculate Estimated Total Catch for a Month
Calculate Mean CPUE for a Month

FIGURE 5

BIOLOGICAL SUBSYSTEM

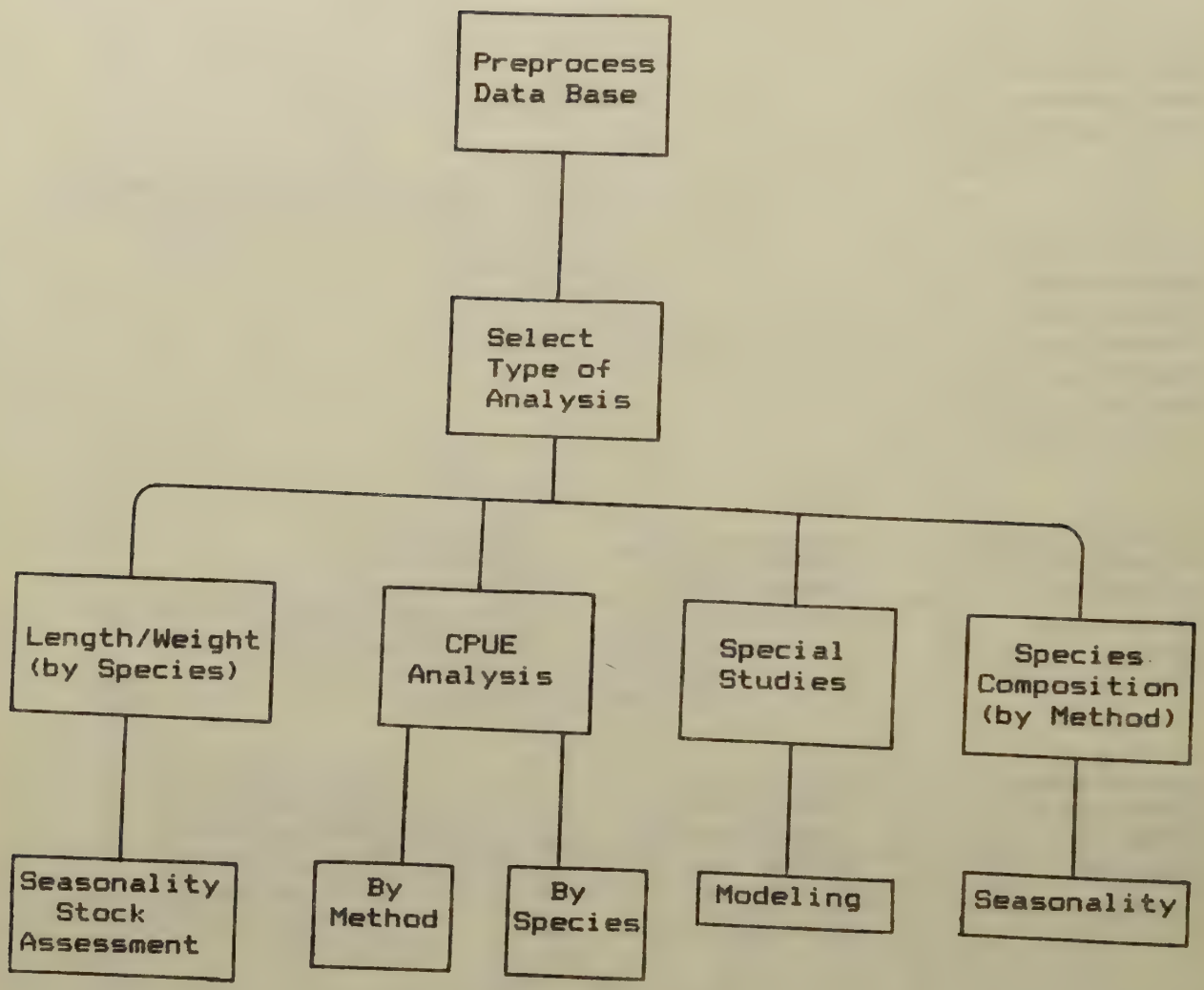
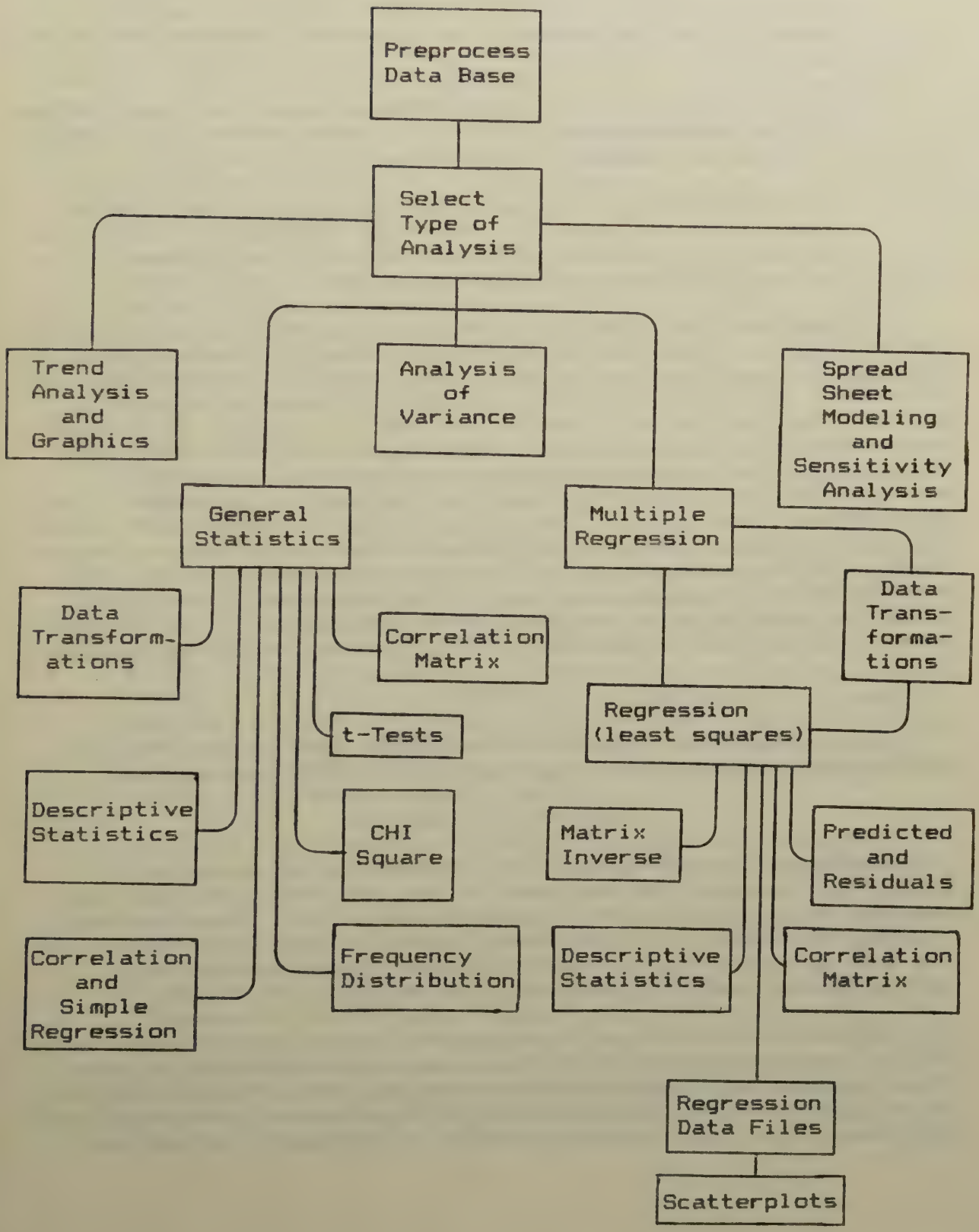


FIGURE 6

STATISTICAL SUBSYSTEM



structure or design. Four alternatives for dealing with this situation became apparent:

1. Status quo.--Continue processing as is.

2. Central processing.--Send all raw data collected at each local agency to WPACFIN for automation, processing, analysis, and report generation.

3. Central computer with terminal communications.--Establish a central WPACFIN computer system and create computer terminal communications links for all participating agencies.

4. Onsite computers at each major data collecting agency.--Upgrade local processing capabilities by establishing computer facilities at each local fisheries office and have pertinent data sent to the central WPACFIN computer in automated form.

Alternatives 1 and 2 were unacceptable because they did not accomplish the basic goal of FIN to provide ready access to quality fisheries data. Alternative 3 would meet nearly all FIN goals, but the cost would have been exorbitant, and it would have put an inappropriate emphasis on a central system. Therefore, the only feasible alternative was to take advantage of recent advances in the microcomputer industry and establish a distributed fisheries information network. This alternative makes it possible to fulfill all FIN goals and at the same time keep the cost reasonable. The SWFC budgeted funds to assist local offices in upgrading their data collecting and processing capabilities in return for their participation in establishing the information network in the central and western Pacific. Thus, the WPACFIN would be established based on upgrading data collecting and processing capabilities of existing fisheries agencies by providing microcomputer hardware and software, and technical support to implement changes.

STATUS

The following sections describe the progress made in the design and implementation of WPACFIN from its beginning in 1981 to January 1985.

Agreements and Committees

Memoranda of understanding for the cooperative implementation of WPACFIN were signed by NMFS and Hawaii in May 1980, Guam in November 1982, American Samoa in January 1983, and CNMI in March 1983. These documents describe the concept of FIN and present general areas of responsibility for the agencies involved. The documents demonstrate the intention of all parties to work toward the cooperative implementation of WPACFIN.

Agreements for sharing of data among NMFS and each participating agency and for handling confidentiality of data have been drafted for all areas. These documents are essential ingredients to the successful implementation of the information network. Because of differences among state, territorial, and Federal regulations regarding handling of confidential information,

legislative changes may be required before agreements can be signed. Guam accomplished this in 1983 and a formal agreement for confidentiality and sharing of data between NMFS and DAWR was signed in March 1983. Agreements need to be signed for all areas to facilitate the exchange of confidential data between NMFS and other participating agencies.

As mentioned previously, the Fisheries Data Coordinating Committee its Technical Subcommittee were formed to help guide the implementation of WPACFIN. To date there have been five meetings of the FDCC, during which the "Guidelines for the WPACFIN Fisheries Data Coordinating Committee" were adopted, a Chairman selected, and many issues discussed and resolved. The DAR participated in these meetings as an "observer" until the December 1984 meeting when they officially joined the committee. During the five FDCC meetings the following areas were discussed and decisions made:

Users.--The users of the system were defined as the agencies participating in the initial implementation of WPACFIN. Other users may be added to the "family" in the future. The FDCC will make judgments on a case-by-case basis as to the qualifications of potential users and whether they should be added. All users are responsible for knowing the origin and restrictions of any data base they use.

Confidentiality.--It was agreed that WPACFIN will not release confidential data without specific permission from the agency that contributed the data to the system. It was further agreed that requests for raw data or requests from nonmember agencies also will be referred to the donor agency. If access is granted by the donor agency, WPACFIN may provide the data to the user from the central system if requested. Confidential data submitted to WPACFIN are generally available for NMFS employees to use provided they have signed a "Statement of Non-disclosure" and have a "need-to-know" as defined in NOAA Directive 88-30. Summary and nonconfidential data in WPACFIN are available to all users without obtaining donor agency approval. Specific restrictions may be placed on sensitive data sets submitted to WPACFIN that could limit access to whomever the donor agency identifies. These limitations could include all NMFS employees other than the WPACFIN data base manager.

Data needs and reporting.--Although no detailed data reporting requirements were identified, NMFS and the Council identified needs for timely summary data on all management unit species. The committee agreed that, since PACFIN produces and distributes summary reports for west coast fisheries, it would be reasonable for WPACFIN to produce and distribute summary reports for central and western Pacific fisheries. It was agreed that WPACFIN would not perform analyses of fisheries, but could produce simple summaries of available data. Approved requests for development of summary reports would be given to WPACFIN, whereas requests for reports involving analyses or interpretations would be sent to the Director of the Honolulu Laboratory or the donor agency. Any reports produced from data in

WPACFIN files must give full and visible credit for the data to the donor agency.

Report production and distribution.--The WPACFIN will be responsible for producing "regional" summary reports. Regional was defined by the FDCC as including data from "more than one island area." Requests for reports on fisheries from a single island area should go directly to the local fisheries agency or, alternatively, to WPACFIN if that would be more expedient. Requests for regional reports should be sent to WPACFIN. If approved, WPACFIN staff will produce the report and will, if necessary, verify results and qualifications of the data with the donor agencies. Detailed specifications for reports will be developed on a case-by-case basis by the requestor and supplier (e.g., local agency or WPACFIN).

Data transfer scheduling.--Members of the FDCC from American Samoa, Guam, and the CNMI agreed to submit updates of major data bases to WPACFIN on a quarterly basis within 60 days of the end of the quarter. This schedule was adopted in June 1984 and will remain in effect unless the FDCC modifies it. It was further agreed that local processing of data in these areas should be kept current within 1 month of collection. This will facilitate "emergency" updates of central WPACFIN files if needed.

Integration of data bases.--The FDCC agreed that it was currently unnecessary to combine similar data bases from different participating agencies into a single data base.

Summarization of data bases.--Summarizations should be done on an island by island basis and the data bases should contain total catch by species by month, and when possible information on gear, area, and value as well.

Communications.--Current plans are for the Council and DAR to have direct computer terminal links to the central data bases. Other participating agencies have no need for a direct link in the foreseeable future and will therefore communicate via diskettes shipped by airmail. It was agreed that users desiring direct access to central data bases will pay for the needed hardware and communications lines. Specific data bases will be made available for direct access on an as-needed basis.

Council data bases.--Generally, data collected by the Council will be available through normal WPACFIN methods. The WPACFIN staff will be the data base manager for Council data bases on the central computer, but users desiring direct access to Council data bases must obtain approval from the Council.

Honolulu Laboratory data bases.--Data will be available via established WPACFIN access methods. Data Management and Technical Services within the Honolulu Laboratory, SWFC will be the data

base manager for Laboratory data bases. Approval for direct access to data bases will be coordinated through the Laboratory Director.

The Technical Subcommittee held workshops, training sessions, and meetings at the Honolulu Laboratory from 29 November to 3 December 1982, and again from 27 February to 2 March 1984. Members from American Samoa OMR, Guam DAWR, and CNMI DFW met with WPACFIN staff and worked on a wide range of technical aspects of implementing WPACFIN, improving data collecting and processing techniques, and managing fisheries data. One of the products of these meetings (Appendix II) has been adopted by the participating agencies as a template for developing their own specific procedures to ensure data and file quality. The Technical Subcommittee also established the use of "pounds" as the standard weight unit to be used in all central data bases. Data bases of major concern to WPACFIN were identified for each participating agency and schedules were established for transfer of data from the agency to WPACFIN.

Projects and Studies

In February 1982 the Council funded historical data compilation projects in American Samoa, CNMI, and Guam. These projects identified sources of fisheries data, quantified the data sets, and described the quality of the data contained therein. The results of these projects laid the foundation for further WPACFIN analysis and initial design.

A study of the Hawaii fisheries statistical data collecting and processing systems was funded by the SWFC in June 1980. A final report titled "Hawaii Fisheries Statistics System Design Study" was distributed by DAR in September 1984. Based on recommendations in the final report, the SWFC has budgeted funds for upgrading DAR's computing capabilities. Before funds can be transferred and upgrades begun, an agreement of confidentiality and data sharing must be completed.

A WPACFIN sponsored survey design project for Guam DAWR was begun in December 1982 and the final report[1] was received in September 1983. The study reviewed the existing DAWR creel surveys and recommended several procedural modifications to improve the statistical validity of the data. The study also developed statistically sound expansion algorithms to estimate island-wide catch, effort, and participation based on the sample data. Formulas for developing 90% confidence limits for the estimates were also presented. The DAWR has implemented the modifications recommended by the study, and WPACFIN personnel have finished writing the computer programs for the expansion of the offshore creel survey data. This Guam Offshore Expansion System (GOES) is the first major data expansion system developed by WPACFIN and consists of seven programs that produce five reports and

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[1]CIC Research, Inc. 1983. A fishery data collection system: Guam. Southwest Fish. Cent. Honolulu Lab., Natl., Mar. Fish. Serv., NOAA, Honolulu, HI 96812, Admin. Rep. H-83-21C, 85 p.

create two summary data files. The WPACFIN personnel recently completed programming a similar data expansion system for the DAWR inshore surveys. The Guam Inshore Expansion System (GIES) is currently being tested by DAWR.

The WPACFIN also funded a survey design project for CNMI that was similar to the one for Guam DAWR. This study also began in December 1982 and was completed in September 1983. The final report[2] identified many steps and procedures to successfully implement a creel survey in Saipan. The recommended survey design and expansion algorithms for DFW are essentially the same as DAWR's. Based on recommendations in the report, DFW has implemented creel surveys on Saipan and is continuing to work with WPACFIN staff to improve and refine sampling techniques. The WPACFIN personnel recently completed the first version of a data expansion system for the Saipan offshore creel survey data base. The system, called the Saipan Offshore Expansion System (SOES), is patterned after GOES and was implemented in December 1984.

Data Collecting and Processing Systems

As stated previously, it is the philosophy of FIN to use existing expertise and data collecting and processing systems as much as possible for the foundation of the information network, and to cooperatively strive to improve and upgrade those systems to meet new data and information needs. When existing systems cannot meet new planning and management needs, new systems will be cooperatively designed and implemented.

After initial analysis of the data collecting and processing systems of the western Pacific fisheries offices, it was decided the most plausible means of establishing an information network in this region would be by creating a microcomputer based system. Because of software availability and hardware reliability, Apple[3] microcomputers were selected as the basic processing units for each fisheries office, and were purchased by WPACFIN in late 1981. Installation of the systems and initial training of local personnel were completed by February 1982. On an interim basis WPACFIN used a PDP 11/70 minicomputer at the East-West Center, Honolulu, Hawaii, for the central computer until January 1983 when the Honolulu Laboratory acquired a Molecular super-microcomputer. Upgrading hardware systems in the field and at the Honolulu Laboratory is an ongoing effort. Figure 7 shows the current WPACFIN hardware configuration. If system growth and use warrant it, major upgrades may be proposed before the end of the suggested system life of 5 years.

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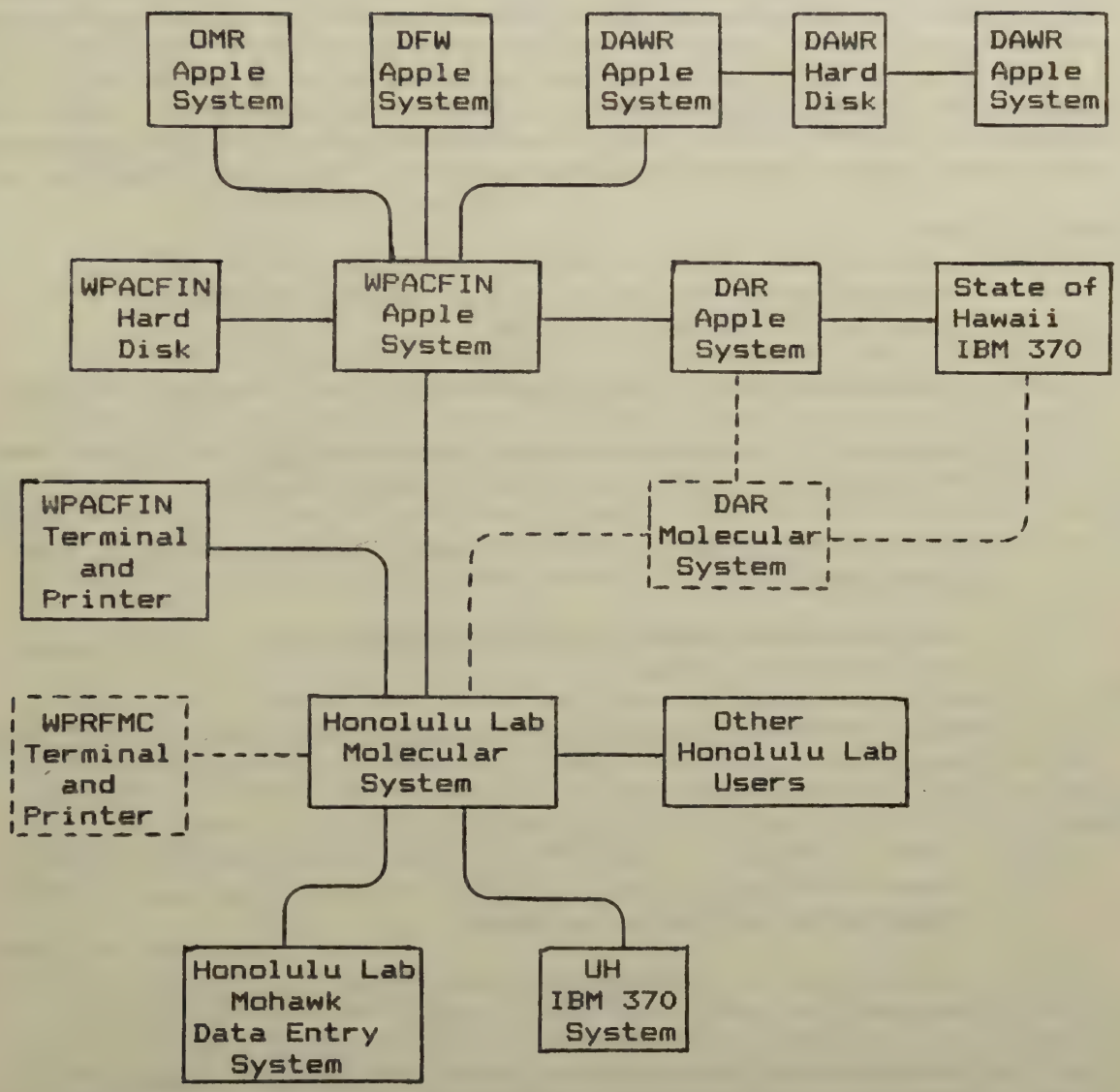
[2]CIC Research, Inc. 1983. A fishery data collection system: Saipan. Southwest Fish. Cent. Honolulu Lab., Natl. Mar. Fish. Serv., NOAA, Honolulu, HI 96812, Admin. Rep. H-83-20C, 74 p.

[3]Reference to trade names does not imply endorsement by the National Marine Fisheries Service, NOAA.

FIGURE 7

HARDWARE CONFIGURATION



——— Solid Lines: Existing Systems

- - - - - Dashed Lines: FY 85 Planned Upgrades

Computer programs for data entry, edit, summarization, report generation, file management, and other data base management functions as well as word processing, statistical analysis, and graphical presentation of data have been supplied to participating agencies. Hardware and software training of local personnel has been provided by WPACFIN staff, as well as assistance in design and implementation of local fisheries data bases, edit reports, summary reports, and processing procedures. As stated in "organization and design," some modules of WPACFIN (Fig. 2) are being implemented before others. Although some software has already been purchased or developed to accomplish at least some activities at most levels in Figure 2, the majority of all activities and processing currently being conducted is contained in the top most module, "data collecting and reporting." Since the beginning of WPACFIN in 1981, there have been many significant improvements in collecting and processing of fisheries data in the western Pacific such as:

American Samoa

1. Computerization of nearly all data processing and data summarization activities at OMR.
2. Improvements in the daily commercial landings system on Tutuila.
3. Extension of commercial landings and shoreline catch data collection activities to Ofu and Olesaga Islands.
4. Design and implementation of a data collecting system for the Sausauimoana research vessel cruises.
5. Design and implementation of an automated vessel inventory and characteristics system.
6. Design and implementation of standard coding systems for fisheries data.

Guam

1. Computerization of nearly all data processing and data summarization activities at DAWR.
2. Improvements in offshore and inshore creel, and participation surveys.
3. Design and implementation of computer based data expansion systems for offshore and inshore creel surveys.
4. Improvements in commercial landings data collection activities.
5. Computerization of available historical commercial landings data and implementation of data collecting and processing systems.
6. Design and implementation of standard coding systems for fisheries data.

Commonwealth of the Northern Mariana Islands

1. Computerization of nearly all data processing and data summarization activities at DFW.

2. Improvements in commercial catch data collecting and processing system.

3. Design and implementation of inshore and offshore creel and participation surveys.

4. Design and implementation of tuna transshipment data collecting and processing system.

5. Design and implementation of an automated vessel inventory and characteristics system.

6. Design and implementation of standard coding systems for fisheries data.

The initial phases of implementing WPACFIN have concentrated on establishing local data bases and a means of communicating and sharing data by providing microcomputer systems, training, and development support to the local fisheries agencies. Subsequent phases will concentrate on developing centralized data bases and software to conduct appropriate expansions of survey data and more indepth analyses of all fisheries data. The foundation of WPACFIN has been laid, but much work still remains at the local level and at WPACFIN.

Data Bases in Place or Under Development

Over 20 automated data bases have been designed and implemented within the network and several more are planned. Neither American Samoa, Guam, nor CNMI have mandatory reporting requirements for commercial fishermen which have increased the difficulty of implementing data collecting systems in each of these areas. The following is an island by island description of what has been accomplished to date, and the status of each of the data bases.

American Samoa

Data collection activities in American Samoa have been conducted by the Office of Marine Resources since the mid-1970's. Virtually all fisheries data available for American Samoa come from OMR. The WPACFIN staff have been working closely with OMR personnel to make data available to qualified users through the information network.

Historical commercial landings, about 1976 to 1980.--This data base has been designed and implemented, but most of the historical data have not been entered due to priorities for entering more recent data. The data base contains landings by species (or species group), fishermen, and trip, and includes some ex-vessel value and operating cost information. This data set is incomplete, but contains catch information for a number of vessels.

Recent commercial landings, 1981 to present.--This data base was established in February 1983 and contains typical landings data such as area, method, weight, value, and price per pound by species (or species group), by fisherman or vessel, and trip. Data have been entered for fiscal years 1982 through 1984. The data represent a sample of the total fishing occurring in American Samoa and not a census of landings. A computer based system to expand the sample data to make total island-wide estimates has been recommended and added to the WPACFIN systems development plans for fiscal year 1985. The more recent the data are, the more reliable and complete they are. Creation of this data base and automation of the data have led to several changes in data collection methods and more are planned in hopes of creating more reliable estimates of total catch by species. This data base is expected to become the mainstay of commercial landings data for Samoa.

Recreational troll surveys, 1975 to present.--Weekly or monthly "standardized" troll fishing trips have been taken in Samoan waters since 1975 to describe and quantify such things as seasonality of species, relative abundance, and status of the stocks. All data from fiscal year 1975 through 1982 have been entered into the data base.

Village subsistence or shoreline catch, fiscal year 1978 to present.--Shoreline "subsistence" fishing surveys have been conducted on the main island of Tutuila for several years. A systematic sampling of villages and time blocks is used to help quantify the total inshore catch by village. fiscal year 1981 through fiscal year 1983 data have been entered into the data base. There are currently no plans to automate data from surveys conducted before fiscal year 1981. The inshore surveys were terminated on Tutuila in fiscal year 1983 when they were started on the other Samoan islands of Ofu and Olesaga. The surveys continued through fiscal year 1984 and are scheduled for expansion to Tau island in fiscal year 1985.

Vessel characteristics, 1983.--This data base has been established for entering characteristics of all vessels in American Samoa. The OMR has historically kept a relatively complete manual list of all the operating fishing vessels, and in fiscal year 1984 updated and improved that list by entering the data into the automated data base. In September 1984 the vessel characteristics data base was significantly modified to permit recording many more data elements about each vessel. The additional information about each vessel will be added to the files during fiscal year 1985.

Tournament data, 1970's to present.--The OMR generally plays a significant role in organizing and operating several fishing tournaments held by the American Samoa Gamefishing Association each year. Data collection forms have been created by OMR to assist in collection of the tournament data by boat/trip/fishermen. A tournament data base was established in September 1984 to store, summarize, and analyze these data. Good estimates on catch per unit effort (CPUE) are expected to be derived from these "recreational" data.

Research vessel cruise data, 1983.--Development of this data base has been discussed by OMR and WPACFIN personnel and an agreement reached that it would be a valuable source of certain types of data that are unavailable through other means. Data collection instruments were developed and a collection program was initiated in September 1983 using the research vessel Sausauimoana. An additional person has been assigned to collect the data on all fishing cruises of the vessel. Data collected while bottom fishing include location, depth, effort, bait, species, weight, and fork length. Trolling data include location, effort, species, number caught, and total species weight. The length, weight, and depth data for the bottom fishes are being entered in a separate length-weight data base. Another data base for capturing all other data is planned for future development.

Length-weight, 1984 to present.--A data base was created in May 1984 to capture data collected from commercial fishermen on species length and weight, and fishing location and depth. Length and weight data from the Sausauimoana are also entered in this data base.

Purse seine landings, 1980 to present.--A data base was created in May 1984 to capture tuna purse seine landings data from cannery summary reports or from transshipment agent's records if catch is offloaded to a transshipment vessel. The data base includes information on vessel, weight by species, date of unloading, and location fished (when available). The data base currently contains data for 1984, but will be updated with previous year's data as time permits.

Codes.--This data base is primarily for documenting and cataloging all codes used in other data bases at OMR. Codes used for identifying species, fishermen, areas fished, gear, disposition of catch, and vessels are stored in this data base for easy reference and update.

Magnuson Fishery Conservation and Management Act data bases.--When and if timely data are required for management purposes, i.e., for billfishes and other pelagic species, special data bases may be created to accumulate and summarize these data. No work or serious planning is currently being done along these lines as no "need" has been identified.

Guam

There are currently two major sources of fisheries data in Guam, the Guam Division of Aquatic and Wildlife Resources commercial fish wholesalers. The WPACFIN staff has been working with DAWR and the three major fish wholesalers to develop direct input of their data into WPACFIN. The DAWR has conducted an intercept creel survey data collection program for inshore (nonboat) and offshore (boat based) fisheries since the early 1970's, but only data since 1977 are considered to be of sufficient quality and quantity to be entered into the system. The WPACFIN sponsored a contract to study DAWR's creel surveys and recommend changes to improve the data collection, processing and expansion methods. The final report was submitted in September 1983 and DAWR's data collection system has been modified to implement suggested changes. A computer-based system, the Guam Offshore Expansion System has been developed, tested, and implemented to expand the

offshore creel survey data into island-wide estimates of catch, effort, and participation by fishing method. Another system, the Guam Inshore Expansion System has been developed for the inshore fisheries and is currently being tested and modified. The GIES will be implemented during fiscal year 1985. The DAWR has recently identified a need and desire to increase their data collecting activities to include data on tuna transshipments by the purse seine fleet offloading in Guam and to increase the coverage of the commercial landings data collected in Guam. They have started laying the groundwork for this activity.

The largest and oldest of the fish wholesalers in Guam is the Guam Fishermen's Coop (Coop), which has been collecting commercial landings data (purchases) since July 1979. The WPACFIN has worked with the Council and the Coop to upgrade the Coop's data collecting activities to better support the information needs of NMFS and the Council. During fiscal year 1984, two additional fish wholesalers in Guam were added to the system by similarly upgrading their data collecting procedures and implementing a mechanism for submission of data to WPACFIN. The DAWR is currently acting as an onsite liaison between WPACFIN and these two newly participating wholesalers.

Participation survey, fiscal year 1980 to present.--Beginning in 1983, DAWR modified its creel survey techniques to include a separate survey to refine their estimates of total fisherman participation by location. A data base was established in December 1983 to automate and summarize these data; it currently contains fiscal years 1983 and 1984 data. A separate data base format was created to record similar types of information for fiscal year 1980 through 1982. Since no actual participation surveys were conducted during these years, data base records were created by using portions of actual interviews taken during creel surveys. These data bases augment information stored in the inshore and offshore creel survey data bases and are used extensively in conjunction with the data expansion system to make estimates of total island-wide catch, effort, and participation.

Inshore creel surveys, 1977 to present.--This DAWR data base was established in January 1982 and now contains data from October 1979 through September 1984. Data from earlier years are being entered as time permits. Data collected include time, date, hours fished, total catch, gear, and number of fishermen, and also a breakdown of catch by species and individual weights and lengths of fishes caught. The catch per unit effort information by gear can be derived from this data base. Data collection methods have changed over the years and progress is being made on improving and standardizing methods to facilitate statistically valid expansion of the sample data to estimate total inshore catch by using GIES. Once this has been done, a separate data base of expanded estimated catches by month may be established.

Offshore creel survey, 1977 to present.--This DAWR data base was implemented in June 1983. It contains basically the same type of information as the inshore survey data base, but is organized around a boat as the sampled entity. Catch, effort, and size-frequency data for pelagic and offshore reef and bottom fish species can be obtained from this data base. Data entry began with fiscal year 1983 data in November 1983 and the

data base now contains all records from October 1979 through September 1984. Entering data from previous years will be accomplished as time and resources permit. As with the inshore survey, improvements to the data collecting, processing, and expansion methods have been made to improve the statistical validity of the estimates of total catch by species. The computerized data expansion system for the offshore surveys, GOES, was implemented in late fiscal year 1984 and expansions of survey data have been made for all years currently on file.

Tournament data, 1977 to present.--The DAWR works closely with the Guam Fishing and Boating Association to collect data during the annual Marianas Fishing Derby. The offshore creel survey data base may be used for automation of these data and the tournament data can be flagged for easy analysis, or a separate data base may be developed for tournament data exclusively. Biological data on stomach contents and sex of fish caught in tournaments will be stored in a separate data base. Data from tournaments other than the derby could be added to these data bases. Tournament data will provide another source of CPUE estimates for offshore species.

Stomach contents of pelagics, 1984.--A data base to store and analyze stomach contents of five of the major pelagic species in Guam was developed and implemented by DAWR during fiscal year 1984. Data from over 1,200 samples of stomachs from yellowfin tuna, skipjack tuna, mahimahi, wahoo, and blue marlin have been entered into the data base. Gonadal information was collected for many of the sampled fish and may be added to the data base during fiscal year 1985.

Wildlife resources species codes.--This data base was established to help organize and document the use of species codes at DAWR. The DAWR code is based on a 5-digit code used in the Newsletter of Systematic Ichthyology distributed by the Department of Ichthyology, California Academy of Science, and is used by many of the world's systematic ichthyologists. The data base contains a cross reference to the National Oceanographic Data Center 10-digit code (NOAA standard), the scientific name with its family, and the accepted common names in English, Chomorro, Hawaiian, and Samoan. To date, over 1,000 species have been entered into the data base, but common names in all languages have not been recorded for all species.

Guam commercial landings system, July 1979 to present.--There are three major fish wholesalers on Guam and all three are currently submitting data to WPACFIN on a voluntary basis. The Coop has been recording data on each purchase made from fishermen since July 1979. Initially, the information collected was strictly for accounting purposes and the breakdown of the catch by species or species group was recorded only if there was a difference in the price of different species. With WPACFIN assistance and Council funding, the Coop modified its data collecting procedures to provide not only better weight and value information by species, but also data on location, method, and effort. The data are recorded by Coop personnel each time a vessel unloads fish and are submitted to WPACFIN at regular intervals. The other two wholesalers similarly collect data and submit them to WPACFIN. These data will prove invaluable in monitoring the commercial fisheries of Guam.

Guam Fishermen's Coop vessel characteristics, 1983.--Several attempts were made during 1983 to collect data on operating characteristics of vessels selling fish to the Coop. Virtually all attempts were unsuccessful and were met with resistance from the fishermen. In December 1983 another alternate plan was developed to collect information by interviewing fishermen. So far, this method has been only minimally successful, and recent indications are that this project will be terminated due to lack of fisherman cooperation. If continued, the socioeconomic data to be contained in the data base will help economists develop models for the fisheries of Guam. The catch and effort data in this file will be compared with similar data from other sources to help managers verify the estimates of total catch and effort for Guam fisheries. If this data collection and data base development effort is successful, this data base will be used in a detailed fisheries analysis project planned by the Council through the University of Guam.

Guam Fishermen's Coop detail trip data base, 1983.--In June 1983 the Coop began collecting more detailed individual trip data from every 10th fisherman unloading fish at the Coop. However, due to problems with several quality control procedures, the effort has been terminated. Unless a significant need for the data is identified, and additional funds are made available, the termination will be permanent.

Magnuson Fishery Conservation and Management Act specific data bases.--As in American Samoa, if the need for Magnuson Act specific data arises for given resources, data bases will be developed to ensure timely reporting of the data.

Commonwealth of the Northern Mariana Islands

The source for virtually all available fisheries data for CNMI is the Department of Natural Resources Department of Fish and Wildlife. The DFW has been collecting fisheries data since the mid-1970's, but until about 1980 methodologies were geared toward generation of economic assessment and development, not stock assessment and fisheries management. Recently WPACFIN has been working closely with DFW to upgrade their data collecting and processing systems to better meet the information needs of today. Most data collection activities undertaken to date include only the most populated island of Saipan. The WPACFIN sponsored a study of DFW's data collection programs similar to the study conducted in Guam. The final report was released in September 1983 and work is progressing to implement recommended changes. Creel surveys similar to the ones being conducted in Guam were implemented in January 1984 and work is continuing to improve sampling techniques.

Historical commercial purchases, 1976 to present.--Traditionally, the major commercial market outlets for fresh fish in CNMI have been the hotels, restaurants, and a few stores on Saipan. Since 1976 DFW has collected data from the major purchasers of fresh fish. Although collection methods, frequencies, and coverages have varied over the years, this data base contains the best historical record of commercial landings in the Northern Marianas. Landings for individual fishermen trips are available from this

data base. Data from 1976 through fiscal year 1984 have been entered into the data base. Some discrepancies exist in the data, especially in the early years, but these are generally due to either a lack of sampling or permanent loss of data. Collection methods and frequencies have been improved significantly since 1982 and a new "trip ticket" invoice system has been developed and implemented. This is the most complete data base for commercial landings information on Saipan's fisheries.

Fishermen logbook system, 1983.--Beginning in early 1983, logbooks were distributed to the most active offshore fishermen on Saipan for collection of detailed trip catch and effort information. After about 6 months, DFW abandoned this activity due to the poor quality of the data and a lack of resources to monitor the fishermen more closely. It is believed that the recently implemented creel surveys will be a better method of obtaining detailed information on the offshore fisheries.

Creel surveys, January 1984 to present.--In 1983 a WPACFIN sponsored survey design project for CNMI was completed. To obtain estimates of total island-wide catch, effort, and participation, the study recommended starting creel surveys similar to those conducted in Guam. In August 1983, DFW began conducting participation surveys to help in the final design and implementation of the creel surveys. The inshore and offshore creel surveys began in January 1984 and work is continuing to refine sampling techniques. A data base for storing and processing the offshore survey data was developed in July 1984 using the comparable Guam data base as a template. A data expansion system similar to the one implemented at DAWR was developed by WPACFIN for the offshore Saipan fisheries and was implemented by DFW in December 1984. A data expansion system for the inshore fisheries is under development by WPACFIN and is scheduled for implementation during fiscal year 1985.

Garapan fisheries facility, July 1983 to present.--A centrally located, commercial processing and marketing facility has been built on Saipan. An operator was contracted to run the facility and it opened for business in July 1983. The DFW is obtaining catch and effort data for every sale by fishermen to the facility via the "trip ticket" invoice system recently implemented. The facility has become the major purchaser of fresh fish from fishermen and has begun importing other fisheries products for sale in Saipan. Data on purchases from local fishermen are incorporated in the commercial purchases data base.

Tinian tuna transshipment, February 1983 to present.--The DFW has been collecting data on the transshipment of tuna at Tinian harbor since February 1983. This data base was created in December 1983 and contains all transshipment data collected. Data for each offloading include date in port, date left port, vessel name, and weights (short tons) of yellowfin and skipjack tunas transferred. Modifications and upgrades of data collecting methods and the data base are continuing.

Vessel characteristics, 1981 to present.--The DFW has manually maintained a list of fishing vessels for several years. The DFW automated its vessel characteristics data base and added more data elements to it. A

new law requiring registration of boats in CNMI was recently passed, and DFW worked with the Department of Public Safety (DPS) to implement the registration system. Unfortunately, DPS was unreceptive to the idea of collecting fisheries data at the time of registration, so DFW will continue tracking vessels by conducting its own surveys. The DFW's data base provides a potential universe for conducting future fisheries surveys.

Codes.--This is primarily an administrative data base for documentating and cataloging all codes used in other fisheries data bases at DFW. Codes used for identifying species, purchaser (hotel, store, etc.), fishermen, areas fished, gear, and vessels are stored in this data base for easy reference and update.

Magnuson Fishery Conservation and Management Act specific data bases.--When and if timely data are required for management purposes, i.e., for billfishes and other pelagic species, special data bases may be created to accumulate and summarize these data. No work or serious planning is currently being done along these lines as no "need" has been identified.

Hawaii

The State of Hawaii Division of Aquatic Resources (formerly Division of Fish and Game) has been collecting fisheries data for more than 30 years and is the major source of State generated fisheries data in Hawaii. Commercial fishermen are required to submit monthly reports to DAR that summarize each fishing day's activities for the month. These data are the most comprehensive source of fisheries information currently available in Hawaii. There are several other data collection systems in progress at DAR, and a recently completed study sponsored by FIN describes these systems and makes recommendations for improvements. The final report of the study was distributed in September 1984. Data collecting and processing activities have historically been more sophisticated and complex in Hawaii than in American Samoa, Guam, or Saipan. Informal sharing of data between DAR and NMFS has gone on for many years. A data share agreenment is being developed, but differences between Federal and State confidentiality laws must be resolved before a formal data sharing agreement can be implemented. Because of these and other complications, the mechanisms for DAR's participation and interaction in WPACFIN have not yet been formalized. Therefore, WPACFIN currently has no Hawaii data bases except those available through the Honolulu Laboratory data management system.

Palau

Although the Republic of Palau is not officially part of WPACFIN, the NMFS has been assisting them in upgrading their data collecting and processing systems through Public Law 88-309 funds to the Trust Territory. The Palau Division of Marine Resources purchased an Apple microcomputer system, and the WPACFIN Program Manager trained several Division staff on its use. Three major fisheries data bases were established to support Palau's current fisheries monitoring and management needs. These included a) total commercial landings by species, b) detailed catch and effort data from sampled vessels, and c) detailed length and weight measurements on

sampled landings. These data bases are WPACFIN compatible and could be made available via established WPACFIN access methods.

Honolulu Laboratory Data Management System

The Data Management and Technical Services is responsible for file management activities at the SWFC Honolulu Laboratory, NMFS. Since 1949 the Honolulu Laboratory has been collecting and processing fisheries data, principally research data, for areas in the central and western Pacific Ocean, and to a lesser extent the Indian Ocean. The Honolulu Laboratory's current file catalog contains entries for over 150 distinctly separate data bases totaling in excess of 4 million records, and shows fiscal year 1984 updating activity in nearly 50 of these data bases. It is beyond the scope of this paper to describe the contents of each of these files. However, the cataloging system divides the files into 11 major catagories which are described below. The Data Management and Technical Services program manager can be contacted for additional information.

Fisheries catch and effort.--There are over 30 data bases totaling more than 2 million records in this category. Many of the files are from vessel logbook collection systems and contain data on weight and numbers of catch and the amount of effort expended to make the catch. Units of measure vary among data bases. Files include data from longline, pole-and-line, and other tuna fishing activities on vessels from the United States, Japan, Taiwan, Korea, and others. Hawaii historical catch report data and certain tournament data are also included in this category.

Fisheries economics.--There are currently about 10 economic data bases cataloged in the system totaling about 650,000 records. Files include fish import and sales information, primarily concerning Hawaii. Purchase data from selected Hawaii wholesale fish dealers are included in this category.

Fisheries landings.--Landings data, as distinguished from catch data, refers to that portion of the catch that is actually landed for sale and processing and does not typically include information on effort or area fished. This category primarily includes data from tuna canneries or tuna fishing vessels for actual sales and offloadings.

Fisheries vessels.--All of the files generated by the Council funded vessel inventory and classification projects are maintained under this category, including vessel registration and documentation information for vessels in Hawaii, Guam, the U.S. Coast Guard, American Samoa, and CNMI. Files also include the Hawaii vessel classification questionnaire data.

Research biological.--This category includes files for research cruise data on biological surveys of plankton, fish eggs, and larvae, including tuna larvae length-frequency information.

Research environmental.--These files include some typical historical oceanographic cruise data such as salinity and temperature, plus nearly 30 years of salinity and air and sea temperature data collected at monitoring stations on Oahu, Hawaii. They also include cruise log data for expendable

bathythermographs and conductivity-temperature-depth stations taken on various cruises.

Research insular.--About 20 data bases totaling over 160,000 records are found within this category from research cruises to the Northwestern Hawaiian Islands and the Mariana Archipelago. Principal files include exploratory and experimental handline, trap, troll, and net fishing on numerous research vessel cruises. Other files include data on ciguatera sampling, seabird stomach analysis, and lobster tagging and morphometrics.

Research mammals.--Hawaiian monk seal census and biological data are maintained in files within this category.

Research pelagics.--Over 30 data bases containing nearly 800,000 records are in this grouping of research data on pelagic species. Most of the data bases are from sampling length, weight, sex and morphometrics of pelagic species, especially tunas. Other files include information on squid, gill netting, and tagging.

Research seamount.--This category includes research cruise data primarily on armorhead stocks collected on various Pacific seamount cruises.

Research vessel.--Research vessel station number and activity log information as well as sightings of birds, aquatic mammals, and significant fish schools are maintained in two data bases under this category.

ISSUES

The nature of the organization and structure of the WPACFIN requires a high level of cooperation and support from many agencies. Although much has been accomplished in the past 3 years to design and implement WPACFIN, there are still some "gray areas" of concern and unknown policy that need to be addressed by participating agencies, the FDCC, and the Technical Subcommittee. Earlier drafts of this document identified up to six pages of "issues" and were used to focus discussions at several of the FDCC and Technical Subcommittee meetings held during the last 2 years. Most of the issues identified in the earlier drafts were resolved and have been incorporated in various sections of this paper as part of the policies and design of WPACFIN. The currently remaining issues are summarized below.

Status of the State of Hawaii Department of Aquatic Resources

Now that the study of DAR's statistics system has been completed, specific mechanisms for the agency's participation in WPACFIN and support of Council and fishery management needs should be identified and formalized. Procedures must be established for handling the complex integration of DAR data into the information network. Some specific activities that require attention are:

1. A data share and confidentiality agreement must be signed between Hawaii Department of Land and Natural Resources and NMFS before

SWFC funds can be made available to upgrade DAR computer capabilities.

2. A detailed analysis of DAR's specific data processing requirements as outlined in the system study needs to be accomplished so the SWFC can write a contract to DAR to support purchase of the computer equipment.

3. The computer hardware must be purchased and installed at DAR. The staff must be trained on its operation and maintenance, and a communication link must be established with the central computer system at the Honolulu Laboratory to facilitate exchange of data.

4. Detailed system design and upgrade modifications of DAR's software and processing procedures need to be developed.

5. The system needs to be developed and implemented on the new DAR computer. Upgrading, automating, and integrating DAR's processing procedures will require a considerable amount of work and time.

Data Sharing and Confidentiality

Data are currently coming to WPACFIN from OMR, DAWR, DFW, and three fish wholesalers on Guam. Since NMFS is bound by its confidentiality regulations as set forth in NOAA Directive 88-30 for any data received from any source, WPACFIN can accept and protect confidential data from all participating agencies. However, without signed agreements of confidentiality with the other government agencies, NMFS cannot provide confidential data to them in return. In March 1983, NMFS signed a confidentiality agreement with Guam DAWR for the sharing of data. Similar documents have been drafted for American Samoa, CNMI, and Hawaii and are being reviewed by the respective fisheries offices and offices of attorney general. In June 1984, the Hawaii Attorney General's office informed DAR that the existing State law permitted DAR to share commercial fisheries data with other fisheries management agencies, but, as a "housekeeping" measure, they further advised an amendment be made to the current statute that requires a cooperative agreement for data exchange. An administrative bill has been drafted for consideration during the 1985 legislative session that will accomplish this housekeeping change. The DAR needs to review the draft agreement sent to them by NMFS some time ago and work with NMFS staff to develop and implement the agreement. Agreements need to be finalized for all remaining areas to permit exchange of data and to ensure the confidentiality thereof.

Future Upgrades

As the network becomes fully operational in the fisheries agencies in American Samoa, Guam, CNMI, and Hawaii, the computer hardware and software upon which it is based inevitably will become technically archaic or physically incapable of handling the expanding work load. When this happens, questions will need to be answered such as:

How will new hardware and software needs be identified and by whom?

Who will determine solutions, and who will select and implement new hardware and software?

Who will pay for future major system upgrades and modifications?

When should major upgrades be planned?

What level of technical and financial support will be available from NMFS?

Another issue that has already begun to surface concerns the expansion of WPACFIN to include other Pacific island areas. As mentioned previously, a WPACFIN compatible system has already been established in Palau. Several other Micronesian island nations have requested assistance from NMFS and WPACFIN in establishing sound data collecting and processing systems to help manage their insular resources. Questions include:

Does NMFS have a responsibility or need to assist?

Do participating WPACFIN agencies have a need for fisheries data from other areas?

Would current WPACFIN users be able to better understand and manage their own local resources by augmenting their data on catch, effort, seasonality, etc. with similar information from other parts of the Pacific? These and other similar questions need to be addressed to fully define the extent and boundaries of the WPACFIN.

SUMMARY

This paper has summarized and described the first 3 years of activities that have been undertaken by participating agencies in the cooperative design and implementation of the WPACFIN. Many significant accomplishments have been made and many milestones reached. As the system has evolved, existing questions have been answered and new questions have been raised. In the months and years to come as participating agencies continue to work together, the system will become the powerful planning and management tool for which it was designed.

Appendix I.--Guidelines for the Western Pacific Fishery Information Network Fisheries Data Coordinating Committee

INTRODUCTION

In recent years, state, territorial, and Federal fishery management agencies in the central and western Pacific region have become increasingly concerned about the need for effective collection, management, retention, and dissemination of data and information used for fisheries research and management. New data demands resulting from activities undertaken to meet the requirements and standards of the Magnuson Fishery Conservation and Management Act of 1976 have accelerated the need for Pacific-wide cooperation among fisheries agencies. To help resolve many of the data-related problems hindering effective development and management of fisheries resources, the Southwest Fisheries Center, National Marine Fisheries Service, (NMFS) developed the concept of the Fishery Information Network (FIN). The overall goal of the FIN is to provide ready access to quality fisheries data needed for management and planning purposes. To accomplish this goal in the region, the Western Pacific Fishery Information Network (WPACFIN) has been established. In addition, the WPACFIN Fisheries Data Coordinating Committee (FDCC) has been established to facilitate participation of area fishery agencies and coordination of activities required to carry out the WPACFIN's objectives.

PURPOSE

Specifically, the purposes of the WPACFIN FDCC are to:

1. Provide a forum for regional eachange of ideas relating to fisheries data, establishing WPACFIN goals and objectives, overseeing operations, and reviewing progress.

2. Establish WPACFIN implementation activities and priorities.

3. Coordinate plans for implementation in each member area and recommend improvements in efficiency, effectiveness and timeliness of data collecting, and processing activities.

4. Promote the development and implementation of data collection, storage, and transfer standards in order to facilitate merging of data into WPACFIN.

5. Designate membership of a Technical Subcommittee and coordinate the Subcommittee's work on technical aspects of implementating WPACFIN.

It is the intent of the FDCC to ensure that all required data are available to the Western Pacific Regional Fishery Management Council (Council) its Plan Development Teams, its Scientific and Statistical Committee, fishery managers, and each participating agency in a form, quality, and time frame necessary to meet their respective fisheries management responsibilities.

MEMBERSHIP

The Fisheries Data Coordinating Committee is comprised of designated representatives from each of the following agencies: Hawaii Division of Aquatic Resources; American Samoa Office of Marine Resources; Guam Division of Aquatic and Wildlife Resources; Commonwealth of the Northern Mariana Islands Division of Fish and Wildlife; the Council; and the Southwest Region and Southwest Fisheries Center, National Marine Fisheries Service. In addition, each agency will appoint at least one person to work on technical aspects of WPACFIN and to represent their agency on the Technical Subcommittee established by the FDCC. When needed, the Technical Subcommittee will call upon consultants to aid it in achieving technical goals.

Representatives on the FDCC should be the Directors of each participating state or territorial fisheries agency, the Executive Director of the Council; the Director of the Honolulu Laboratory, Southwest Fisheries Center and the Administrator of the Western Pacific Program Office of the Southwest Fisheries Region. Substitutions will be discouraged to ensure continuity in understanding and decisionmaking.

Other organizations and members may be added at the request and agreement of the Committee.

OPERATING PROCEDURES

At least one meeting will be held each year, and it will be scheduled early in the calendar year to facilitate budget planning for WPACFIN, state, and territorial activities for the following fiscal year. It is envisioned that meetings of the FDCC will be scheduled around existing Council meetings in order to maximize attendance of members and minimize additional travel expenses and impact on schedules of the participants. Additional meetings may be scheduled around Council meetings as needed. Meetings of the FDCC are expected to last no more than 1 day. The Technical Subcommittee shall meet at least once every year.

The Committee will elect a chairman for a 2-year term of office. The SWFC will appoint its WPACFIN program manager as the executive officer who will assist in scheduling meetings, developing agendas, and preparing minutes of the meetings. In addition, the executive officer will serve as the Chairman of the Technical Subcommittee and will coordinate its activities and report them to the FDCC.

All member agencies will have equal authority to recommend items for discussion and action by the FDCC or WPACFIN. Member agencies will have equal right to vote on matters coming before the FDCC. Recommendations of the FDCC will be passed by majority vote of member agencies and only when affected agencies are in agreement. Any member agency may terminate its membership by 30 days written notice to all other members.

FUNDING

The Southwest Fisheries Center, National Marine Fisheries, NOAA will pay necessary travel and per diem costs for members not supported by other Federal funds to attend meetings. This support will be provided within the limits of available funding to members of the Fisheries Data Coordinating Committee and its Technical Subcommittee.

Appendix II.--Guidelines for data quality control and file management procedures developed by the Technical Subcommittee of the Western Pacific Fishery Information Network, Fisheries Data Coordinating Committee, May 1984.

The Western Pacific Fishery Information Network (WPACFIN) was created to provide mechanisms for making fisheries information from American Samoa, Guam, the Commonwealth of the Northern Mariana Islands (CNMI), and Hawaii available on a timely basis. To help insure that only quality data enters WPACFIN systems, the Technical Subcommittee of the WPACFIN Fisheries Data Coordinating Committee (FDCC) developed the following guidelines or standards for establishing data handling procedures. It is strongly recommended that participating agencies use these standards to develop and implement specific quality control procedures and practices that will best suit each agency's individual circumstances and insure the integrity of the data. These standards have been developed primarily by participants from American Samoa, Guam, and CNMI working in conjunction with the WPACFIN project manager, and therefore reflect the microcomputer orientation of their data processing procedures.

Designing Data Collection Forms

1. Forms should be designed to make recording of data in the field as easy and accurate as possible and as complete as necessary. Whenever possible, a single page should be used to collect all pertinent information, and sufficient space should be provided for all recording.

2. Forms should be organized to make the entry of data into the computer as easy as possible. Avoid multiple page collection forms, and design forms to reflect the data input order of elements whenever possible.

3. Forms should be designed to minimize writing long descriptions. For example, gear types may be listed on the form for the data collector to check the appropriate entry. Recording information not required should be minimized, recorded on unused space (e.g., the back of the sheet), or recorded in a separate fieldbook.

4. Data entry codes for elements should be included on the forms (i.e., in parentheses) next to the long form description whenever possible. For instance, using the gear type example, Spearfishing(01)____, Handlining(03)____, Trolling(05)____.

5. A set of laminated code forms or overlays should be provided to each data collector for use under adverse field conditions. The laminated forms should be reusable if possible. Data collected on laminated sheets should be transcribed immediately upon return to the office.

Designing Codes

1. Codes should be used to help simplify collecting, entering, processing, and summarizing data. Codes are used to reduce recording and keying time, to reduce record length and save space, and to make summarization of data as easy as possible. For example, the commonly used code for months is usually the numbers 1 through 12.

2. Use existing codes whenever possible and practical.

3. Codes should be as "user friendly" as possible. They should be as short, easy to remember, and logical as possible.

4. Codes should allow the flexibility of adding new, or forgotten, elements. Use of single digit codes offers the least amount of flexibility and should be considered only when the possibility of expanding the code list is extremely remote.

Using Codes

1. All data collectors should have a good working knowledge and understanding of the codes used before going into the field to collect data.

2. Codes should be used in the field whenever possible and practical (i.e., 1- and 2-digit codes especially), and a copy of the codes with their corresponding description/definition should be available to each data collector for easy referral. Such a code list will reduce the need for writing long descriptions and therefore increase the efficiency of data collection. It will also reduce the need for coding of forms back in the office, thus decreasing the time required to prepare the forms for key punching and eliminating possible human error. For example, codes for "area fished" would be recorded in the field rather than the longhand written description, and the data collector would have an easy-to-read map with all the fishing areas coded for reference. Code lists and maps should be laminated whenever possible.

3. When it is not possible or practical to use codes in the field, coding of the longhand descriptions should be done as soon as possible after the data collection activities are completed. It is also advisable (if not mandatory) for each data collector to code their own forms to help reduce interpretation errors.

Handling Forms

1. Data collection forms should be legibly completed in their entirety and should be kept together as much as possible. In the field this will help in the collection process, and in the office it will help track documents through the system and possibly simplify editing and verifying the data.

2. Forms should be reviewed by the data collector as soon as possible after the field work is done. If the data collector is not available for this verification process, another data collector or someone very familiar with the process should review them as soon as possible and contact the original data collector when problems arise. Forms should be verified for completeness, accuracy, and legibility of all entries.

3. Rewriting or recopying of forms should be avoided to reduce transcription errors. Field data should not be collected on one set of forms (or pieces of scratch paper) and then transferred to other forms for entry and archiving. When transcription of field data is necessary, it should be done by the original data collector as expeditiously and carefully as possible.

Entering Data into the Computer

1. The person entering data should have a working knowledge of the computer (Apple II+), the data entry computer program (DB Master), the specific input format and routine being used, the forms (their use, organization, codes, and potential problems), and the types and use of data being entered.

2. The entry person should not "guess or interpret" entries on forms when they are not legible, but should contact someone with firsthand experience with the data collection activity.

3. The "last record default mode" of the DB Master data entry routine should be used whenever possible. When used properly, this mode can reduce entry time and the number of key strokes required, and it can also assist in record verification.

4. The data entry person should enter records in an organized manner and should keep careful track of where they are in entering the data records. This is especially important because of interruptions and possible power or hardware failure.

Editing the Data

1. Edit reports should be produced on a "regular basis" to verify that data have been collected and entered correctly. A "regular basis" may depend of the volume and complexity of data being entered, but should be frequent enough to keep reports a reasonable size. An upper limit is probably 1,000 records.

2. The "auto-date" field in DB Master data bases can be used to produce reports on data entered on specific dates and can, therefore, make verification of data easier.

3. The first level of reports to be produced should be "listings" of the data that simply dump all data to the printer using a report format that makes verification as simple as possible. These

reports are typically reviewed by the person entering the data to find entry errors.

4. The second level of edit reports produced generally includes summarizations and possibly calculations and are typically reviewed by the data collectors or "owners" of the data to help locate recording or logic errors (i.e., missing or misplaced decimal points, incorrect methods for species caught or area fished, etc.).

5. The original data collection forms should be consulted before making corrections to the data base. Be sure that all errors noted on reports are corrected in the data base and not just on the reports.

Managing Data Bases

1. Back up all files on a regular basis to avoid the possibility of losing data because of damage to the diskettes caused by power or hardware failure. The grandfather-father-son method of backing up should be used on valuable or large data bases. As a general rule, data bases that are active (e.g., undergoing frequent changes) should be backed up (reblocked) on a frequent basis. Once a data base is considered to be complete and has undergone all of the quality control edits established for it, all three copies should be reblocked to the final version. One of these final copies should be sent to WPACFIN Honolulu for entry into the central system and for the added safety of offsite storage.

2. Keep an accuarate record of activities of each data base. For instance, information should be kept on when records were added or updated, how many records the data base contains, what reports have been produced, and which version (copy) of the data base is the most recent.

3. Keep track of who has copies of the data base or reports from it, so if updates occur they can be informed of the changes.

4. Send a copy of your data base for inclusion in the central WPACFIN data bases only after all possible verifications and validations of the data have been completed and the data are considered to be as "clean" as possible.